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DATA SCIENCES CORPORATION
OEM MARKETING
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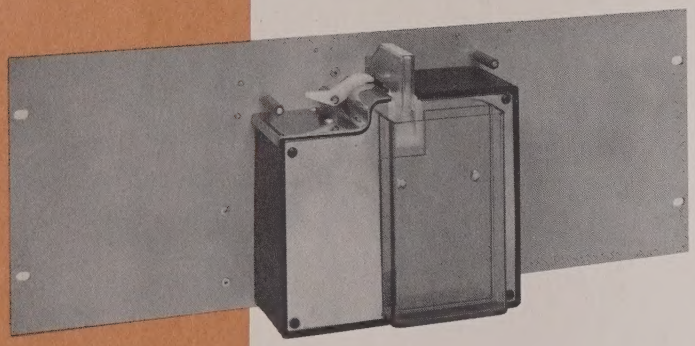

2110

PAPER TAPE PUNCH

TECHNICAL ASSISTANCE MANUAL

rm No. M-1401-70©MDS-70
nted in USA 3/6/70

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TABLE OF CONTENTS

SECTION	PAGE
1. DESCRIPTION	1
1.1 General	1
1.2 Product Application	1
1.3 Physical Description	1
1.4 Operation	1
1.4.1 General	1
1.4.2 Method of Punching	3
1.5 Controls	4
1.6 Installation	4
1.7 Maintenance	4
1.8 Accessibility	5
1.9 Optional Features	5
2. INTERFACE SPECIFICATIONS	9
2.1 Interface Connectors	9
2.2 Input Signal Specifications	11
3. GENERAL INFORMATION	13
3.1 Purchase Orders	13
3.2 Documentation	13
3.3 Optional Features	13
3.4 Service	13
3.5 Shipping Information	14
3.6 Ordering Information	14

LIST OF FIGURES

FIGURE	PAGE
1-1 2110 Paper Tape Punch	ii
1-2 Principles of Operation	2
1-3 Method of Punching	3
1-4 2110 Mounting Data	4
1-5 Feature G - Graphic Art Format Advance Feed Hole	5
1-6 Feature T - Tape Reverse Orientation	5
1-7 Feature D - Model 2110 with a Small Main Panel	6
1-8 Feature S - Model 2110 with a 6" Supply Reel mounted on the right side of the Main Panel	6
1-9 Feature R - Spooler Mechanism	7
2-1 DC Interface	9
2-2 AC Connections	10
2-3 2110 Timing Diagram	11

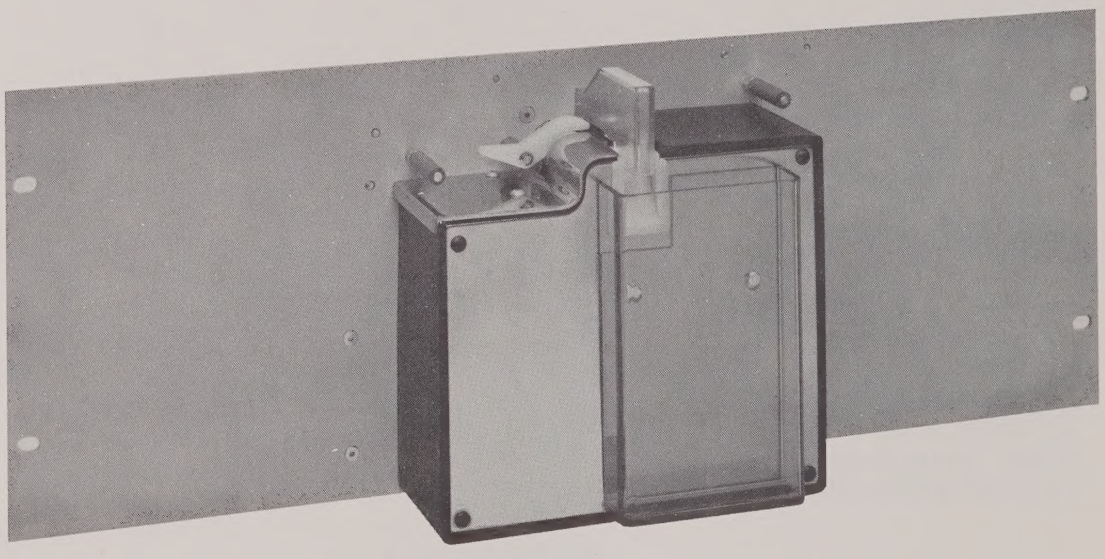

Figure 1-1. 2110 Paper Tape Punch.

SECTION 1
DESCRIPTION

1.1 GENERAL

The 2110 is an economical, clutch-driven, panel-mounted paper tape punch designed for medium-speed, high-reliability applications. The 2110 punches standard 5, 6, 7, or 8-channel paper tape asynchronously at speeds up to 30 characters per second. Six inch spoolers for supply and take-up are available.

The unit, which is driven by a continuously running AC motor, has provisions for punch error checking, tape backspacing, pulse stretching, and circuit holding.

The 2110 punch is quiet, dependable, and easy to service. No critical pulse widths or regulated power supplies are required.

1.2 PRODUCT APPLICATION

The unit accepts data from input devices such as paper tape readers, card readers, magnetic tape readers, electric typewriters, and similar devices, and records it in the form of holes on paper tape.

1.3 PHYSICAL DESCRIPTION

The punch mechanism and associated components are mounted on a 7 by 19 inch panel.

Basically, the unit consists of an AC motor-driven, single-revolution clutch that operates a positive punching and retracting mechanism. Clutch cycling and data punching are controlled by electromagnets.

The 2110 is easily interlocked (electrically) with external equipment.

1.4 OPERATION (See Figure 1-2.)

1.4 GENERAL

The Model 2110 Tape Punch operates in response to signals to 8 electromagnets (1) which control punch pin interposers (2). A clutch electromagnet (3) controls a single-revolution clutch (4). A constantly rotating electric motor supplies the mechanical power to drive the punch pins (5) through the tape (6). When the clutch electromagnet (3) is energized, it couples the motor to the camshaft (7). As the camshaft (7) makes its revolution, the eccentric cam (8) moves the interposer shaft (9) vertically. Interposers (2) mounted on this interposer shaft (9) drive their corresponding punch pins (5) through the tape (6) when their corresponding electromagnets (1) are energized. The camshaft (7) during its single revolution also oscillates the feed arm (10) which drives the ratchet wheel (11) to move the tape (6) forward during the last quadrant of camshaft (7) rotation. A backspace magnet (12) is provided to step the tape in the reverse direction. Bifurcated contacts (13) are provided on the interposer and clutch magnets for error checking and other circuitry functions. Two cam contacts (14a and 14b) are provided to control the duration of the pulses into the electromagnets, to interlock the unit with connected equipment, and for other circuitry functions. The two cams (15a and 15b) are independently mounted on the camshaft (7) and the on time is adjustable from 135°to 245°. Each can be phased in 15°increments. All the electrical points are brought out to the connector.

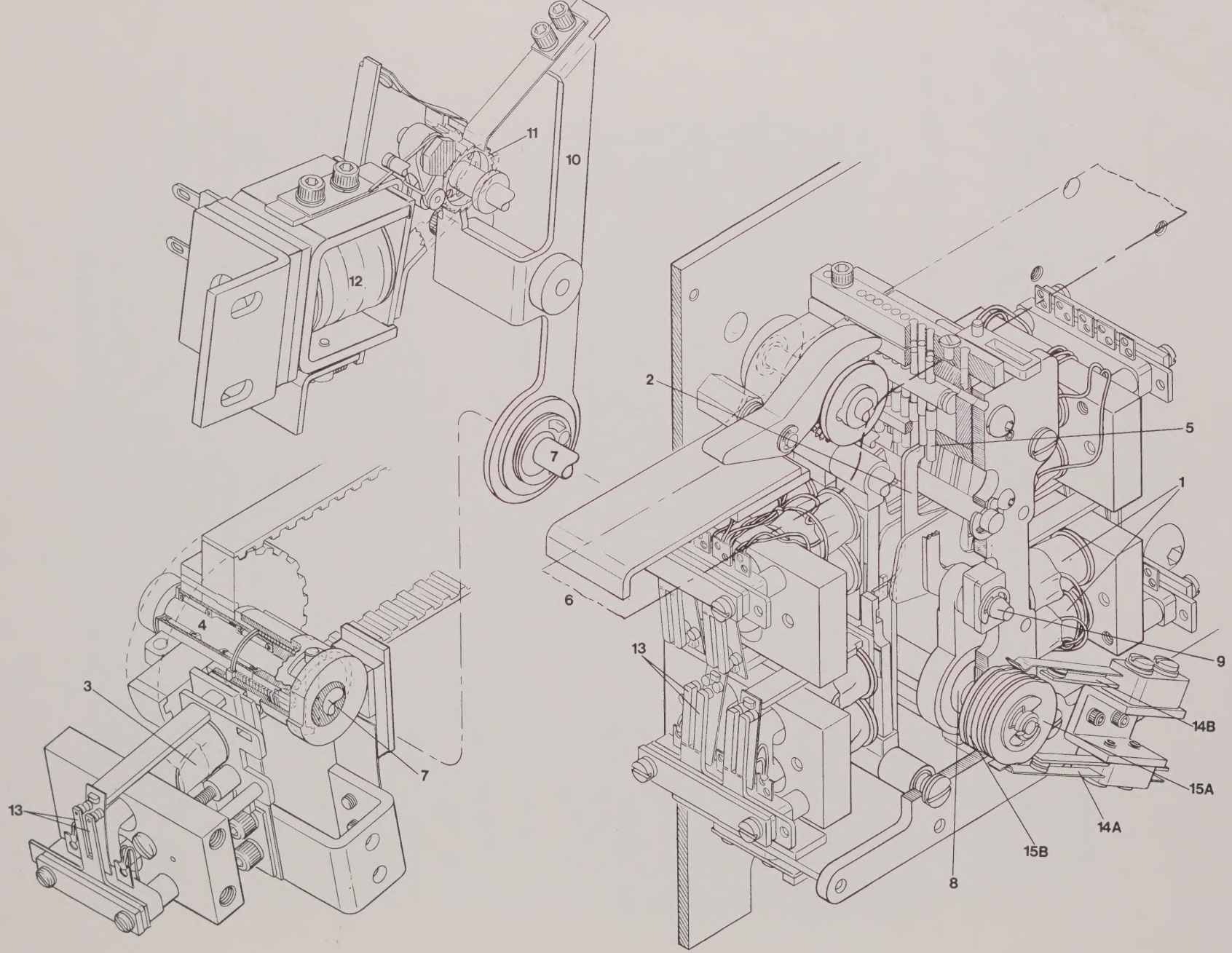

Figure 1-2. Principles of Operation.

1.4.2 METHOD OF PUNCHING (See Fig. 1-3.)

Interposers are mounted on an interposer shaft. When the camshaft is rotated through a single revolution, eccentric lobes on the camshaft move the interposer shaft vertically to drive the interposers upward towards the punch pins, which perforate the tape.

When a data magnet is energized, its corresponding armature is attracted and held away from its interposer, as shown in Step 2, Fig. 1-3. This releases the interposer arm, so that the interposer may move vertically to engage the punch pins.

Simultaneously, with the energization of the data magnets, the clutch magnet is operated to couple the motor to the camshaft. Punching occurs when the camshaft rotates to its 180°position, moving the interposer upward to drive the punch pin through the tape, as shown in Step 3, Fig. 1-3.

A data magnet which is not energized is shown in Steps 1 and 4, Fig. 1-3. As the camshaft is rotated to the 180°position, the interposer is latched by magnet armature and is deflected away from the punch pin, preventing tape perforation.

During the downward return stroke of the interposer shaft, all punches are positively withdrawn from the tape by means of stripper shaft and stripper links, as shown in Step 1, Fig. 1-3.

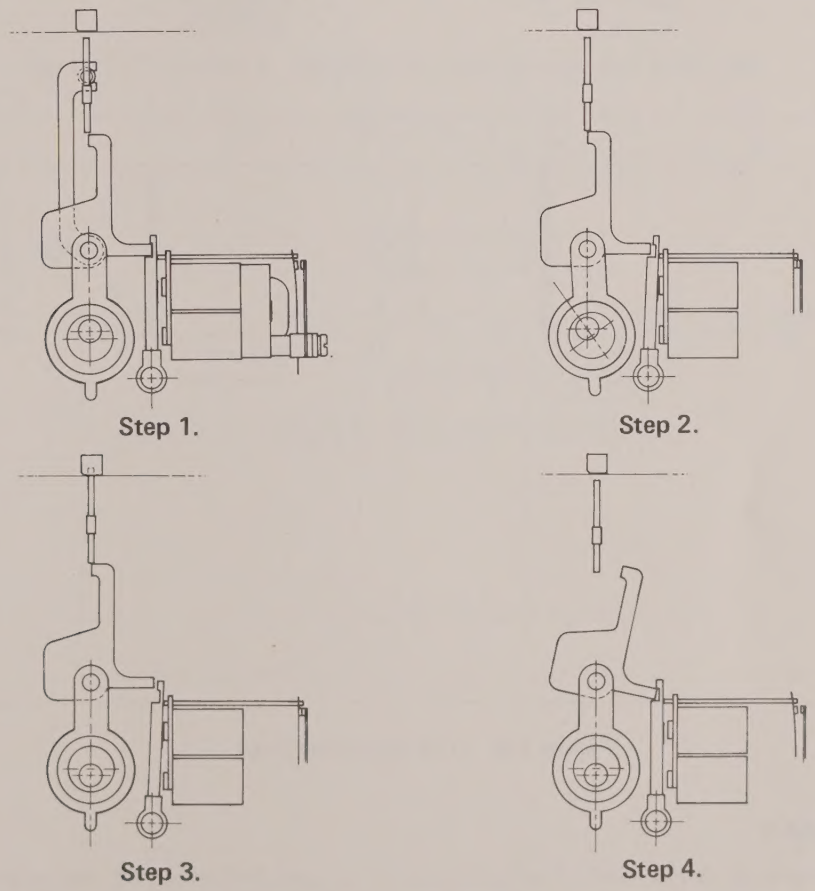

Figure 1-3. Method of Punching.

1.5 CONTROLS

No external controls are provided. Any controls desired must be designed by the user, as required by the type and function of the external equipment being used. All the electrical points are brought out to the connector. Key information relating to interfacing is found in Section 2.

1.6 INSTALLATION

Care should be exercised in the unpacking and installation of the unit. Since the 2110 is an open-back unit, the exposed components are vulnerable to damage.

Mounting data for the 2110 Paper Tape Punch is illustrated in Figure 1-4.

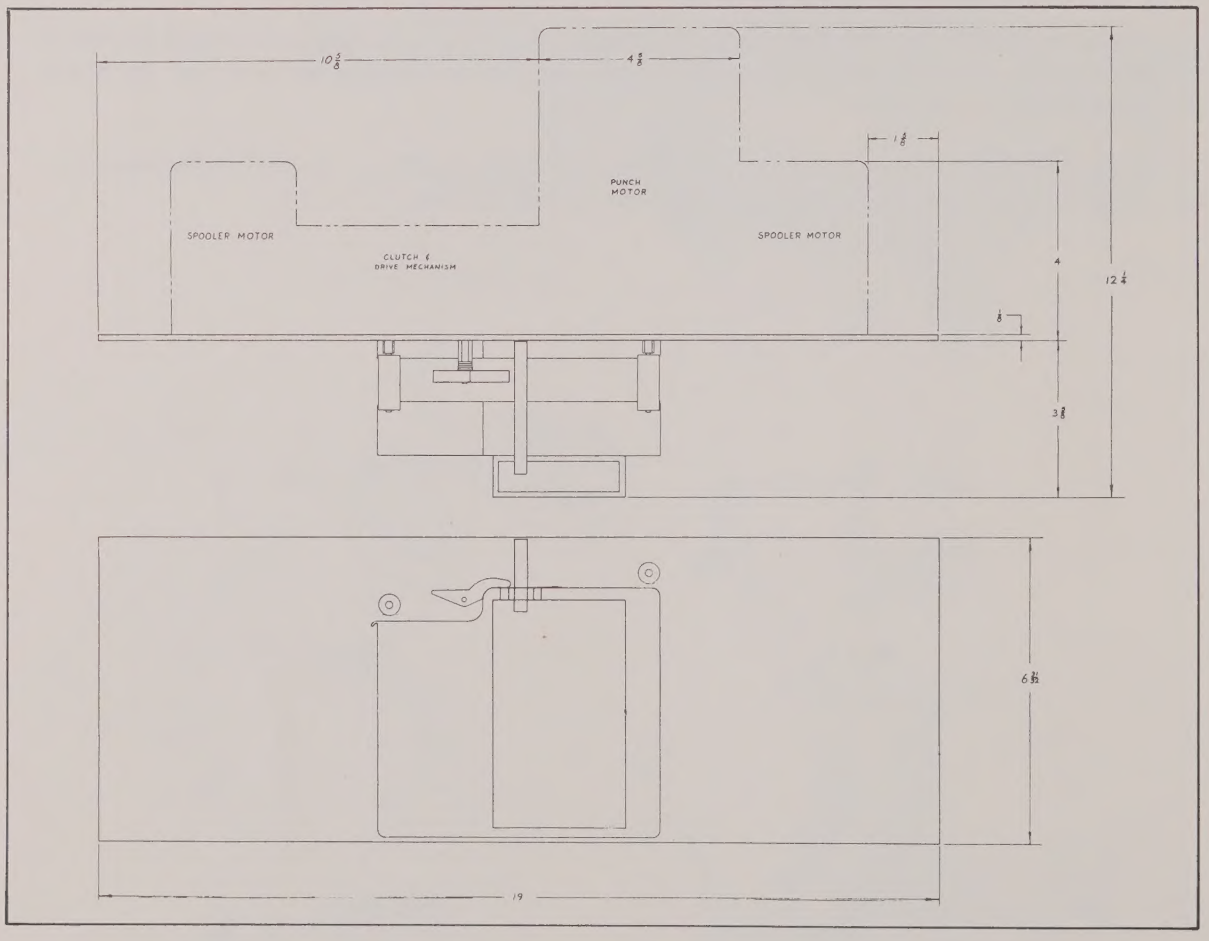

Figure 1-4. 2110 Mounting Data

1.7 MAINTENANCE

Preventive maintenance in the form of parts lubrication should be performed after every 500 hours of operation. Lubrication procedures are provided in the maintenance manual supplied with the unit.

1.8 ACCESSIBILITY

Design characteristics of the 2110 Punch allow easy access to all components of the unit. In the event of clutch or punch failure, design advantages of the 2110 allow easy replacement in the field.

1.9 OPTIONAL FEATURES

With Feature G, the standard punching format is modified for use with systems that require advanced feed hole format. An example of Feature G punching is shown below. As seen in the diagram a line drawn tangent to the leading edge of the feed hole is also tangent to the leading edge of the data holes. This format differs from the standard format in which a center line is common to the centers of the data and feed holes.

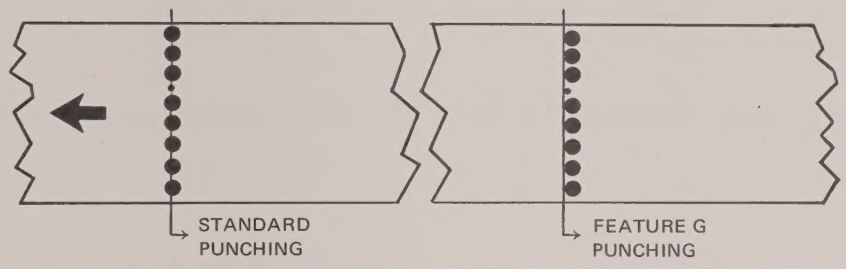

Figure 1-5. Feature G - Graphic Art Format Advanced Feed Hole.

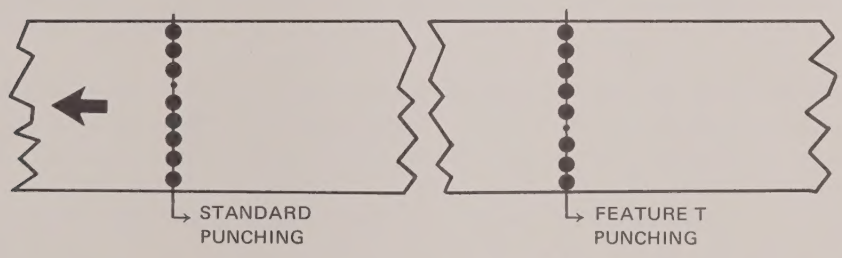

Figure 1-6. Feature T - Tape Reverse Orientation.

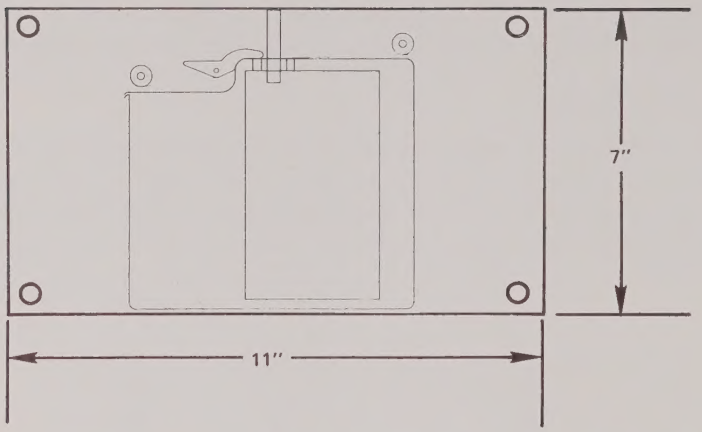

Figure 1-7. Feature D - Model 2110 With A Small Main Panel (Spooling not available).

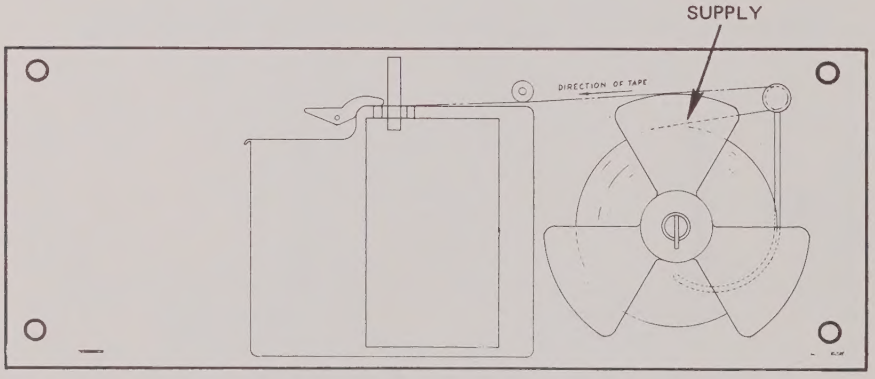

Figure 1-8. Feature S - Model 2110 with a 6" Supply Reel Spooler Mounted on the right side of the Main Panel.

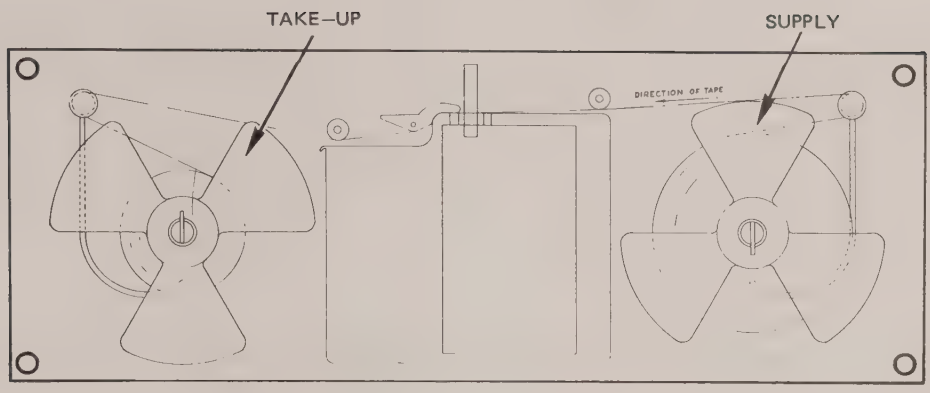

Figure 1-9. Feature R - Spooler Mechanism.

The spooler mechanism is comprised of two motors which take up or feed out tape through a gear train. The 6" spoolers are mounted on a standard 7" x 19" panel.

Two sensing arms operate three micro switches each, through three-lobed cams assembled to the rear extension of the sensing arms.

When the sensing arms are in the full outward position (end of tape) or inward position (tight tape), the cams transfer a switch to the "normally closed" position removing A.C. from the motor, and also provide an A.C. signal to terminal block points No. 3 or No. 4 denoting a "tape condition." Two of the remaining switches provide a "motor-off" position when the arms are in their half-way position. The remaining two switches control the direction of rotation of the motors.

When the arms are to the outside of "motor off" position, in reference to panel center, the switches cause take-up (clockwise spool rotation) on the take-up spooler and take-up (anti-clockwise spool rotation) on the supply spooler.

When the arm is positioned inward toward panel center ("motor off" position), the spooler rotation noted in the above paragraphs is reversed. See Figure 1-9.

TABLE 1-1. SPECIFICATIONS

PAPER TAPE SPECIFICATIONS

Tape Channels: 8
Data Hole Size: 0.072" Dia. on 0.100" centers (EIA standard RS-227)
Feed Hole Size: 0.046" Dia. (EIA standard RS-227)
Tape Widths: Adjustable for 0.687, 0.875, and 1.000"

ELECTRICAL

AC Requirements:
Clutch Drive Motor: 1/12 HP, 1,725 RPM synchronous, 117 VAC/60 Hz—205 VA (230 VAC/50 Hz, available on request)

DC Requirements:
Power Supply: 24 or 48 VDC
Clutch Magnet: 5 watts
Data Magnets: 5 watts each
Back space magnet: 24 watts

DC Power Requirements:
70 watt max.—all magnets energized
45 watt max.—normal punch operation

Connector: Amphenol mating connector supplied with unit

Clutch Magnet Contact: Form A, 2 amp

Punch Magnet Contacts: 8 Form A. One side common. 2 amp. Used for error checking pulse stretching, or holding circuitry.

INTERFACE

PUNCH MAGNETS
Pull-in Time: 5 to 15 milliseconds

CLUTCH
Pull-in Time: 10 to 15 milliseconds

TIMING
The clutch magnet may be energized simultaneously with punch magnets. No time delay or special circuitry is required.

PHYSICAL

Height: 7 inches
Width: 19 inches (2110D, 11 inches)
Clearance: 3.6 inches front, 8.5 inches rear
Weight:
2110: 17.5 lbs.
2110D: 15.5 lbs.
2110S: 20.5 lbs.
2110R: 23.5 lbs.
Color: gray
Punching Speed: 0-30 characters per second asynchronously

SECTION 2

INTERFACE SPECIFICATIONS

2.1 INTERFACE CONNECTORS

MATING CONNECTOR

PIN NO.	ASSIGNMENT
1	Channel 1 in
2	Channel 2 in
3	Channel 3 in
4	Channel 4 in
5	Channel 5 in
6	Channel 6 in
7	Channel 7 in
8	Channel 8 in
9	Clutch magnet coil
10	Common
11-12	Cam switch S1
13-14	Cam switch S2
15	Backspace magnet (+)
16	Backspace magnet (-)
20	Common
21-28	Punch magnet contact out
29-30	Clutch magnet contact out
31-36	Unassigned

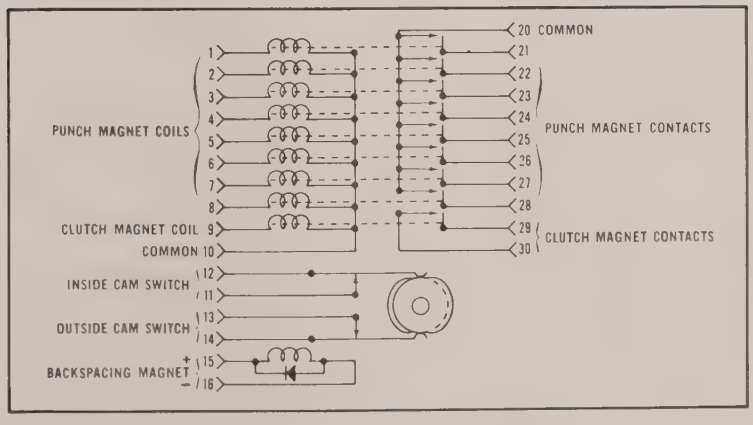

Figure 2-1. DC Interface

TERMINAL BLOCK (AC CONNECTIONS)

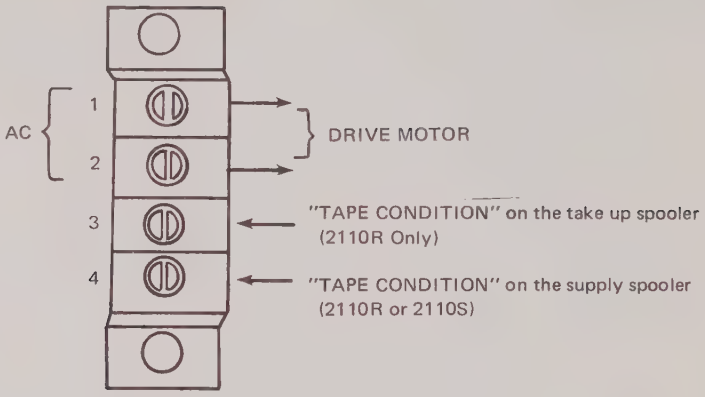

Figure 2-2. AC Connections.

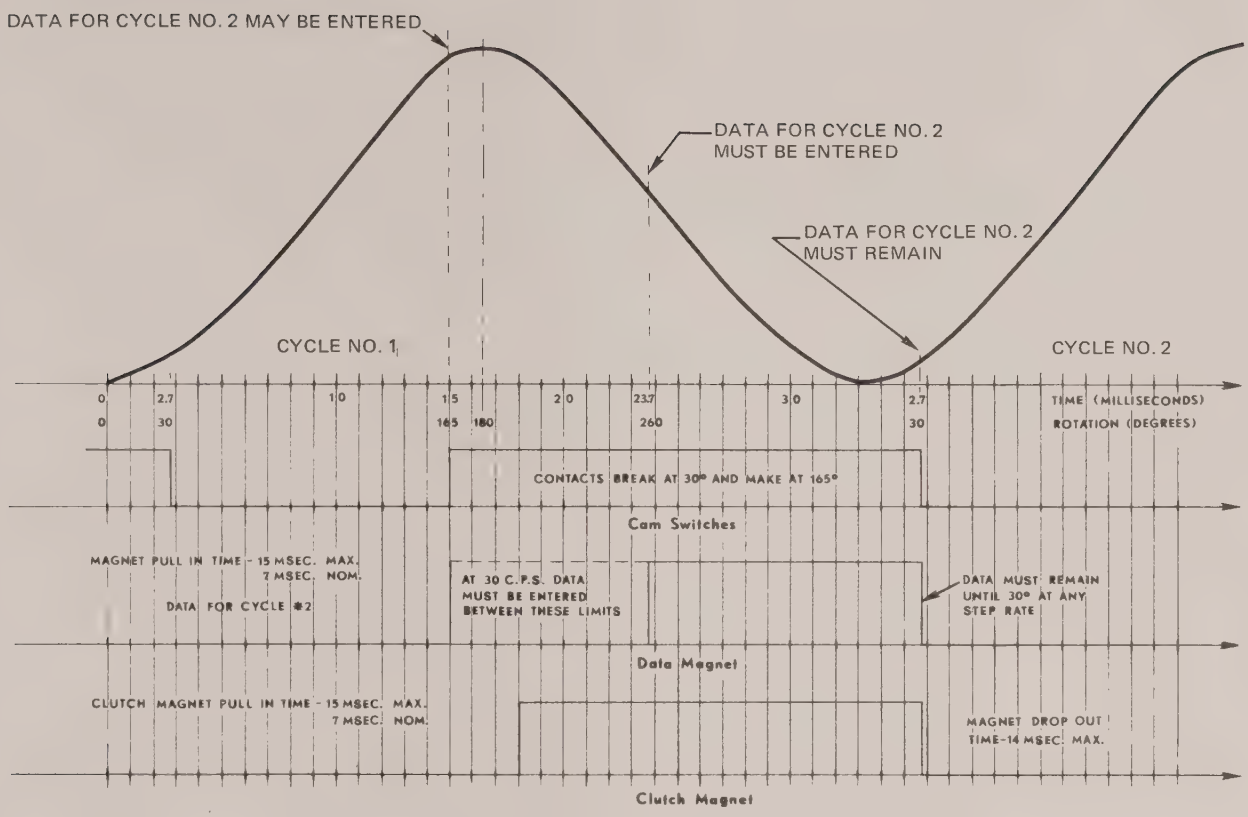
DATA FOR CYCLE NO. 2 MAY BE ENTERED
DATA FOR CYCLE NO. 2
MUST BE ENTERED
DATA FOR CYCLE NO. 2
MUST REMAIN
CYCLE NO. 1
CYCLE NO. 2
0 2.7 10 15 20 23.7 30 2.7
0 30 165 180 260 30
TIME (MILLISECONDS)
ROTATION (DEGREES)
CONTACTS BREAK AT 30° AND MAKE AT 165°
Cam Switches
MAGNET PULL IN TIME - 15 MSEC. MAX.
7 MSEC. NOM.
DATA FOR CYCLE #2
AT 30 C.P.S. DATA
MUST BE ENTERED
BETWEEN THESE LIMITS
DATA MUST REMAIN
UNTIL 30° AT ANY
STEP RATE
Data Magnet
CLUTCH MAGNET PULL IN TIME - 15 MSEC. MAX.
7 MSEC. NOM.
MAGNET DROP OUT
TIME-14 MSEC. MAX.
Clutch Magnet

Figure 2-3. 2110 Timing Diagram.

2.2 INPUT SIGNAL SPECIFICATIONS

A 24 or 48 VDC* voltage is required to activate the punch electromagnets. The 8 electromagnets represent the 8 channels on the paper tape. Activation of the electromagnet allows a hole to be punched in the paper tape. The punch magnets are rated at 5 watts (continuous duty). Pull-in time is in the range of 10 to 15 milliseconds.

A 24 or 48 VDC* voltage is also required for operating the clutch. The clutch magnet may be energized simultaneously with the punch magnets. No time delay or special circuitry is required. The clutch magnet is rated at 5 watts (continuous duty). Pull-in time is in the range of 10 to 15 milliseconds.

A 24 or 48 VDC* signal is used for activating the backspacing magnet. Applying this voltage to pins 15 and 16 backspaces the papertape one frame. The backspacing magnet is rated at 17 watts nominal, continuous duty.

*Coil voltage must be specified when ordering.

In addition to the DC signals required for operating the punching mechanism, a 115 VAC 60 Hz, Single phase supply must be provided for operating the drive motor. The drive motor is a continuously running motor used for driving the punching mechanism.

SECTION 3

GENERAL INFORMATION

3.1 PURCHASE ORDERS

Orders for Mohawk Data equipment, including systems, parts and accessories shall not be binding upon Mohawk Data until duly approved by Mohawk Data at the factory of manufacture. Changes to any order are subject to acceptance by Mohawk Data in writing, at which time pricing and delivery adjustment will be stated.

3.2 DOCUMENTATION

Mohawk Data shall supply one (1) instruction manual containing operating instructions, wiring diagrams, schematics, parts list, and recommended spare parts lists within thirty (30) days of acceptance of standard Mohawk Data equipment, or within ninety (90) days of acceptance of customized equipment.

3.3 OPTIONAL FEATURES

Optional features may be ordered by the Feature Title listed in paragraph 3.6.

For ordering information other than above, please contact your MDS OEM Sales Representative.

3.4 SERVICE

Service contracts are available from MDS provided no modifications have been made to the unit.

Service schools are available on a tuition basis.

MDS service locations are extensive as shown in the listing on page 15. Qualified technicians in the service areas are well-trained and very responsive to a customer's needs.

Training classes are a continuous process for MDS personnel and this same high quality training is available to customer personnel upon request. All training classes are conducted in Herkimer, New York.

The types of classes, cost per student, and other detailed data can be obtained by contacting the Customer Service Division of MDS, Harter Street, Herkimer, New York.

MDS offers two types of maintenance arrangements for the service of OEM equipment. In brief, type one is a maintenance contract which covers time and material on a 9 a.m. to 5 p.m. weekday basis. This type of arrangement includes preventative maintenance as well as emergency maintenance within the above hours.

The second type is a time and material arrangement where all time and material is charged on an individual call basis.

The area MDS representative can provide specific data regarding either type of maintenance arrangement.

3.5 SHIPPING INFORMATION

The price for systems and accessories includes commercial packaging for shipment for motorized padded van for deliveries in the continental United States and for shipment by air freight for deliveries elsewhere. The price for parts includes commercial packaging for common carrier shipment, except for ocean freight. Other packaging shall be quoted by Mohawk Data Sciences Corp. upon request.

3.6 ORDERING INFORMATION

BASIC MODEL 2110

The standard 2110 Paper Tape Punch punches 5, 6, 7, or 8-channel paper tape at 30 cps. The punching mechanism is mounted on a 7" x 19" panel. No spooler mechanisms are provided.

When ordering, specify 24 or 48 VDC.

OPTIONS*

G	Graphic Arts Format advanced feed hole
T	Tape Reverse Orientation
D	Small panel 7" x 11" without spoolers
R	6" spoolers for model 2110, mounted on a 7" x 19" panel
S	6" supply reel spooler, for model 2110 mounted on a 7" x 19" panel

*Order optional models by correct model numbers, i.e., a 2110 with option G is a 2110G, a 2110 with options G and R is a 2110GR.

PAINT:

The standard color of the equipment is gray. Color No. 26492 Per FS 595. Special paint to customer specifications requires a set-up charge and an additional charge for each panel. The customer must supply the paint specification and a paint chip.

U.S. SERVICE AREAS

AREA	LOCATION
480	Alabama, Birmingham
485	Alabama, Mobile
870	Arizona, Phoenix
520	Arkansas, Little Rock
930	California, Los Angeles
895	California, Sacramento
910	California, San Diego
900	California, San Francisco
830	Colorado, Denver
150	Connecticut, Hartford
170	Connecticut, Stamford
330	Delaware, Wilmington
505	Florida, Jacksonville
500	Florida, Miami
510	Florida Orlando
490	Florida, Tampa
470	Georgia,Atlanta
475	Georgia, Macon
840	Idaho, Boise
680	Illinois, Bloomington
670	Illinois, Chicago
685	Illinois, Springfield
695	Indiana, Fort Wayne
690	Indiana, Indianapolis
725	Iowa, Cedar Rapids
735	Iowa, Davenport
730	Iowa, Des Moines
765	Kansas, Topeka
430	Kentucky, Louisville
535	Louisiana, Baton Rouge
530	Louisiana, New Orleans
360	Maryland, Baltimore
100	Massachussetts, Boston
160	Massachussetts, Springfield
640	Michigan, Detroit
660	Michigan, Grand Rapids
645	Michigan, Lansing
635	Michigan, Saginaw
720	Minnesota, Minneapolis
760	Missouri, Kansas City
750	Missouri, St. Louis

AREA	LOCATION
740	Nebraska, Omaha
300	New Jersey, Union
200	New York, Albany
240	New York, Buffalo
250	New York, New York
230	New York, Rochester
220	New York, Syracuse
450	North Carolina, Charlotte
455	North Carolina, Greensboro
425	North Carolina, Raleigh
615	Ohio, Akron
600	Ohio, Cincinnati
620	Ohio, Cleveland
610	Ohio, Columbus
605	Ohio, Dayton
625	Ohio, Toledo
585	Oklahoma, Oklahoma City
590	Oklahoma, Tulsa
955	Oregon, Portland
315	Pennsylvania, Allentown
245	Pennsylvania, Erie
325	Pennsylvania, Harrisburg
320	Pennsylvania, Philadelphia
350	Pennsylvania, Pittsburgh
310	Pennsylvania, Reading
140	Rhode Island, Providence
435	South Carolina, Greenville
460	Tennessee, Chattanooga
465	Tennessee, Knoxville
445	Tennessee, Memphis
440	Tennessee, Nashville
570	Texas, Dallas
550	Texas, Houston
560	Texas, San Antonio
855	Utah, Salt Lake City
415	Virginia, Norfolk
410	Virginia, Richmond
385	Virginia, Roanoke
405	Washington, D.C.
950	Washington, Seattle
710	Wisconsin, Madison
700	Wisconsin, Milwaukee

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